Appendix D

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[0009] The invention, therefore, according to one aspect provides an operations, management, capacity, and services (OMCS) tool comprises a means for analyzing business parameters for a plurality of network architectures; and comparing the business parameters for said network architectures for determining cost savings of one network architecture versus another and for determining a business solution that articulates the network architecture for reducing total expenditure.

[0010] The business parameters comprise the total expenditure; and wherein the total expenditure comprises capital expenditure (CAPEX) and operational expenditure (OPEX). The CAPEX comprises a network architecture cost; taxes; interests; and deprecation and amortization (D/A) expenses. The OPEX comprises a management processes cost; a leasing cost; and sales, general and administration (SG&A) expenses.

[0011] The business parameters further comprise revenue; capacity; return on investment (ROI); earnings before interest, taxes, and deprecation and amortization (EBITDA); earnings before interest and taxes (EBIT); OPEX as percentage of revenue; and total expenditure as percentage of revenue.

[0012] The OMCS tool means for analyzing the business parameters comprises means for analyzing the business parameters for a network architecture having one or more of the following technology: TDM, ATM, FR, IP, VPN, MPLS, and optical Ethernet including fiber, synchronous optical network (SONET), resilience packet ring (RPR), and dense wavelength division multiplexing (DWDM). This means further comprises a means for computing the business parameters for each of said network architectures over a pre-determined study period.

[0013] The OMCS tool means for comparing the business parameters for the plurality of network architectures comprises means for reporting the business

parameters for each of said network architectures over said pre-determined study period, wherein the business solution comprises the network architecture with the least total expenditure.

[0014] The OMCS tool further comprises means for engineering a plurality of network architectures for a pre-determined input user data; determining a network architecture cost and a leasing cost for each of said network architectures over a pre-determined study period; engineering management processes for managing each of said network architectures; and determining a management processes cost for said management processes over said pre-determined study period. The tool further comprises means for inputting user data; and validating and calibrating the input user data; the network architecture cost; the leasing cost; and the management processes cost for each of said network architectures.

[0015] The OMCS tool means for engineering the plurality of network architectures comprises a means for determining an owned network elements (NEs) count; a leased NEs count; an owned customer premise equipment (CPE) count; a leased CPE count; an owned links count; a leased links count; and a leased ports count for each of said network architectures; and wherein said network architectures having NEs, CPE, and links from the same or different equipment suppliers.

[0016] The OMCS tool means for determining the network architecture cost and the leasing cost for each of the plurality of network architectures comprises means for determining an owned cost (a price) per network element (NE), a footprint per NE cost, and a power consumption per NE cost; determining an owned cost (a price) per CPE, a footprint per CPE cost, and a power consumption per CPE cost; and determining an owned cost (a price) per link and a link transmission rate.

[0017] The means for determining the network architecture cost comprises means for computing a total owned NEs cost; a total owned CPE cost; and a total owned links cost for each of said network architectures over said pre-determined study period. The means for determining the leasing cost comprises a means for computing

a total footprints cost and a total power consumptions cost for said NEs and CPE over said pre-determined study period.

[0018] The OMCS tool means for determining the leasing cost further comprises means for determining a leased per NE cost, a footprint per NE cost, and a power consumption per NE cost; determining a leased per CPE cost, a footprint per CPE cost, and a power consumption per CPE cost; determining a leased per link cost and a link transmission rate; determining a leased link per unit length cost, a unit length per link count, and a link transmission rate; and determining a leased per port cost. This means further comprises means for computing a total leased NEs cost; a total leased CPE cost; a total footprints cost and a total power consumptions cost for said NEs and CPE; a total leased links cost; a total leased links for unit length cost; and a total leased ports cost for each of said network architectures over said pre-determined study period.

[0019] The OMCS tool means for engineering the management processes comprises means for engineering network management processes; and service and customer management processes, wherein said management processes having said processes from the same or different management processes suppliers.

[0020] The means for engineering network management processes comprises a means for selecting one or more of the following processes: inside plant maintenance; outside plant maintenance; network engineering; network provisioning; installation; testing; and repairs.

[0021] The means for engineering service and customer management processes comprises a means for selecting one or more of the following processes: customer relationship management (CRM); work order management (WOM); network inventory management (NAI); service activation and provisioning (SAP); fault management (FM); performance management (PM); accounting and billing; and security management.

[0022] The OMCS tool means for determining the management processes cost comprises a means for determining a process cost per NE for each of said network management processes for one or more of the following: a manual operations mode; a mechanized operations mode; and a manual and mechanized operations mode. The means for determining the management processes cost further comprises a means for determining a process cost per link for each of said service and customer management processes for one or more of the following: a manual operations mode; a mechanized operations mode; and a manual and mechanized operations mode.

[0023] Another aspect of the invention provides a computer program containing instructions for directing a computer to perform a process for analyzing business parameters for a plurality of network architectures, and comparing the business parameters for said network architectures over a pre-determined study period.

[0024] The program comprises means for causing the computer to receive data for the plurality of network architectures; analyze the received data to compute the business parameters for said network architectures; and compare said computed business parameters for said network architectures for determining cost savings of one network architecture versus another and for determining a business solution that articulates the network architecture for reducing total expenditure.

[0025] The program means for causing the computer to receive the data for the plurality of network architectures comprises means for causing the computer to receive input user data; network architectures data; and management processes data for said network architectures. The input user data comprises traffic data; customer data; and financial and labour data for the plurality of network architectures. The network architectures data comprises network elements (NEs) data; CPE data; links and ports data; and further comprises network architectures options for said network architectures. The management processes data comprises network management data; service and customer management data; and further comprises network management options; and service and customer management options for managing each of said network architectures.

[0026] The program means for causing the computer to analyze the received data comprises a means for causing the computer to compute the business parameters for said network architectures over said pre-determined study period.

[0027] The program means for causing the computer to compare said business parameters for said network architectures comprises a means for causing the computer to tabulate and graphically chart the business parameters for said network architectures over said predetermined study period.

[0028] In accordance with a first embodiment of this invention, the program is a self-contained Microsoft EXCEL-based decision support software tool comprises a plurality of EXCEL workbooks. A number of EXCEL workbooks are for receiving input user data; network architectures data and options; and management processes data and options. A workbook is for analyzing and combining the received data; and another workbook for computing the business parameters for a plurality of network architectures. In yet another workbook, the computed business parameters are tabulated and graphically charted for each of said network architectures.

[0029] In accordance with a second embodiment of this invention, the program is a self-contained software tool comprises a plurality of sub-programs linked together and the sub-programs are written in one or more of the following computer languages: machine language, C/C++, virtual basic, and Java. A number of sub-programs are for receiving input user data; network architectures data and options; and management processes data and options. A sub-program is for analyzing and combining the received data; and another sub-program is for computing the business parameters for a plurality of network architectures. The computed business parameters are then passed to another sub-program for tabulating and graphically charting the business parameters for each of said network architectures.

[0030] A further aspect of the invention provides a method for developing business solution for a telecommunications network using the OMCS tool. The

method comprises the steps of receiving data for a plurality of network architectures; analyzing the received data to compute business parameters for said network architectures; and comparing said computed business parameters for said network architectures for determining cost savings of one network architecture versus another and for determining a business solution that articulates the network architecture for reducing total expenditure.

[0036] This invention provides an operations, management, capacity, and services (OMCS) tool and method for developing business solution for a telecommunications network. The OMCS tool automates the calculation of the business parameters for a plurality of network architectures and enables comparison of technology alternatives for said network architectures. The OMCS tool provides a comprehensive business solution that articulates the savings of one network architecture versus another and identifies the areas for cost reduction.

[0037] The embodiments of the present invention provide improved software tools and methods for business solution for a telecommunications network that would overcome the shortcomings and limitations of the prior arts.

[0061] The input user data 110 module enables an analyst to input user data and options for a plurality of network architectures to be modeled. The input user data comprises traffic data; customer data; and financial and labour data. The options enable the analyst to select technology alternatives for network architectures and management processes for managing said network architectures.

[0067] The business parameters comprise total expenditure, wherein the total expenditure comprises capital expenditure (CAPEX) and operational expenditure (OPEX). The CAPEX comprises a network architecture cost, taxes, interests, and deprecation and amortization (D/A) expenses; and the OPEX comprises a management processes cost; a leasing cost; and sales, general and administration (SG&A) expenses.

[0068] The business parameters further comprise financial and business statistics comprising revenue; capacity; return on investment (ROI); earnings before interest, taxes, and deprecation and amortization (EBrIDA); earnings before interest and taxes (EBIT); OPEX as percentage of revenue; and total expenditure as percentage of revenue.

[0069] The reporting business solutions 170 module reports in tables and graphical charts the business parameters for each of said network architectures over said pre-determined study period.

[0087] The ARCH1 520 having switching nodes 521 and services nodes 522 from supplier A 501; add/drop nodes 524 and cross-connect nodes 524 from supplier B 502; and other nodes 525 from supplier C 503. The ARCH2 530 having switching nodes 531 and services nodes 532 from supplier A 504; add/drop nodes 534 and cross-connect nodes 534 from supplier B 505; and other nodes 535 from supplier C 506. The ARCH3 540 having switching nodes 541 and services nodes 542 from supplier A 507; add/drop nodes 544 and cross-connect nodes 544 from supplier B 508; and other nodes 545 from supplier C 509.

[0094] A total footprints cost 675 is determined by multiplying the sum of the owned CPE count 650 and the leased CPE count by the footprint per CPE cost 670. A total owned CPE cost 660 is determined by multiplying the owned CPE count 650 by the price per CPE 655. A total leased CPE cost 680 is determined by multiplying the leased CPE count 663 by the leased per CPE cost 665. A total power consumptions cost 690 is determined by multiplying the sum of the owned CPE count 650 and the leased CPE count 663 by the power consumption per CPE cost 685.

[0097] The ARCH1 720 having T1 721 and T3 722 links from supplier A 701; E1 723 and E3 724 links from supplier B 702; and DSL links 725, 10/100 BT 726, and 100/1000 BT 727 links from supplier C 703. The ARCH2 730 having fiber 100FX 731 from supplier A 704; OC3 732, OC12 733, OC48 734, and OC 192 links from supplier B 705; and DWDM ring 736, RPR ring 737, and 1000SX/1000LX 738 from

supplier C 706. The ARCH3 740 having SONET ring 741 and microwave 742 links from supplier A 707; fiber 100 FX 743 and 100/1000 BT 744 links from supplier B 708; and DSL 745 and T3 746 links from supplier C 709.

[0151] Procedure 1700 adjusts and updates data (block 1780) as required and re-analyzes the business parameters (block 1740). When analysis is completed for the pre-determined study period, procedure 1700 reports the business parameters for said network architectures over the pre-determined study period. The reporting of said business parameters comprises tabulating and graphically charting the business parameters for each of the network architectures over said pre-determined study period, thus, finishing the procedure 1700 (block 1795).

[0168] FIG. 21 shows an illustrative graphical output from an execution of the OMCS tool of FIG. 1. The graph 2100 plots dollars per Mbps 2010 over five years study period 2120, year0, year1, year2, year3, and year4 for five network architectures ARCH1 2130, ARCH2 2135, ARCH3 2140, ARCH4 2145, and ARCH5 2150. The five architectures represent the five different technologies described in FIG. 18 above. In graph 2100 it can be seen that the return on investment for ARCH5 2050 is higher than the other architectures.

[0169] The embodiments of this invention provide a software tool that automates the calculation of the business parameters for a plurality of network architectures. The OMCS tool enables comparison of different network architectures comprising NEs, CPE, and links from the same or different equipment suppliers, and network, service, and customer management processes from the same or different management processes suppliers.

Abstract

An operations, management, capacity, and services (OMCS) tool and method are presented for analyzing business parameters for a plurality of network architectures; and comparing the business parameters for said network architectures

for determining cost savings of one network architecture versus another and for determining a business solution that articulates the network architecture for reducing total expenditure. The business parameters comprise capital expenditure (CAPEX), operational expenditure (OPEX), total expenditure, revenue, capacity, return on investment (ROI), and other business and financial statistics. The OMCS tool and method determine the business solution for an owned, a leased, or partially owned and leased telecommunications network. The business solution further comprises network architecture having network elements (NEs), customer premise equipment (CPE), and links from the same or different equipment suppliers; and having network, service, and customer management processes from the same or different management processes suppliers.